

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID A. JOHNSON

Appeal No. 95-0326
Application No. 07/877,253¹

ON BRIEF

Before JOHN D. SMITH, GARRIS and WEIFFENBACH, Administrative Patent Judges.

GARRIS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the final rejection of claims 9 through 12, 14 through 19, 21, 22, 24 through 26, 28 through 31, 33 through 36, 38, 39 and 43. The only other claims

¹ Application for patent filed April 28, 1992. According to appellant, this application is a continuation of Application 07/621,268, filed December 3, 1990, now abandoned; which is a division of Application 07/331,250, filed March 29, 1989, now abandoned.

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remaining in the application have been indicated by the examiner as being either allowed or allowable.

The subject matter on appeal relates to a process for forming a thermally stable, low resistance ohmic contact on a major surface of a III-V semiconductor substrate comprising the steps of (a) doping to form an active region to which the ohmic contact is to be made, (b) introducing a Group VI element onto the surface of the active region to form treated portions comprising a thin film at most a few monolayers thick, (c) forming a metal contact on the treated portions and (d) heating the metal contact to form said low resistance ohmic contact.

This appealed subject matter is adequately illustrated by independent claim 28 which reads as follows:

28. A process for forming a thermally stable, low resistance ohmic contact on a major surface of a III-V semiconductor substrate, comprising:

(a) doping at least one region in said major surface of said III-V semiconductor substrate with a dopant to form an active region to which said ohmic contact is to be made;

(b) introducing a Group VI element onto the surface of said at least one active region to form treated portions of said III-V surface of said at least one active region, said treated portions comprising a thin film at most a few monolayers thick;

(c) forming a metal contact, capable of forming an ohmic contact to said III-V semiconductor, on said treated portions of said III-V surface to form a metal contact thereto; and

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(d) heating said metal contact and said III-V semiconductor to form said low resistance ohmic contact.

The references relied upon by the examiner as evidence of obviousness are:

Anderson et al. (Anderson), "Ohmic Contacts To GaAs For High-Temperature Device Applications," Conference Paper at "Ohmic Contacts" (March 25-27, 1981) pp. 39-42.

Japanese patent (Nagaoka '191)	60-161191	Jan. 30, 1987
Japanese patent (Nagaoka '192)	60-161192	Jan. 30, 1987
European patent (Cunningham)	252,300	Jan. 13, 1988

Claims 28 through 31, 33 through 36, 38, 39 and 43 stand rejected under 35 U.S.C. § 103 as being unpatentable over Anderson taken with Cunningham, and claims 9 through 12, 14 through 19, 21, 22 and 24 through 26 stand correspondingly rejected over these references and further in view of either of the Nagaoka references.

We refer to the Briefs and the Answer for a complete exposition of the opposing viewpoints expressed by the appellant and the examiner concerning the above noted rejections.

OPINION

For the reasons set forth below, none of the rejections advanced by the examiner can be sustained.

We fully agree with the appellant's conclusion expressed in the Briefs that the applied references and in particular Cunningham would not have suggested providing Anderson's process with the step of introducing a Group VI element onto the surface of an active (i.e., doped) region as required by step (b) of the independent claims on appeal. This is because Cunningham, rather than introducing such an element onto the surface of a doped region, fabricates delta-doped layers of a Group VI element at a distance from the metal-semiconductor junction (which corresponds to the here claimed surface); e.g., see the paragraph bridging columns 1 and 2 on page 2. We do not perceive and the examiner does not explain how Cunningham's step of fabricating delta-doped layers at a distance from his metal-semiconductor junction would have suggested (or inherently practiced) the here claimed step of introducing a Group VI element onto the surface of the active (i.e., doped) region whereat the appellant's metal-semiconductor junction is to be formed.

In light of the foregoing, we cannot sustain the examiner's § 103 rejection of claims 28 through 31, 33 through 36, 38, 39 and 43 as being unpatentable over Anderson taken with Cunningham. Moreover, since the above discussed deficiencies are not supplied by the Nagaoka references, we also cannot sustain the § 103

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rejection of claims 9 through 12, 14 through 19, 21, 22 and 24 through 26 as being unpatentable over Anderson taken with Cunningham and further in view of either of the Nagaoka references.

The decision of the examiner is reversed.

REVERSED

JOHN D. SMITH)	
Administrative Patent Judge))	
)	
)	
BRADLEY R. GARRIS)	BOARD OF PATENT
Administrative Patent Judge))	APPEALS AND
)	INTERFERENCES
)	
CAMERON WEIFFENBACH)	
Administrative Patent Judge))	

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